PRODUCT INFORMATION

BENTELER HYRESIST® HFS*

Seamless hot rolled tubes for the safe distribution of hydrogen

BENTELER Steel/Tube is a leading global manufacturer of seamless and welded high-quality carbon steel tubes. Our expertise in steel development is the foundation for our product portfolio allowing BENTELER to provide customer-specific solutions.
Through many years of experience, we consistently generate highly customized tube solutions for the automotive, energy and industrial markets. The products we manufacture for sustainable applications reinforce the company's commitment to sustainability.

Hydrogen is considered an attractive energy option in the industry. Hydrogen production, processing and distribution networks are rapidly expanding.
This increases the demand for suitable tube solutions: Our high-quality BENTELER HYRESIST® tubes make it easier for companies in the industry and the mobility sector, as well as energy producers to handle hydrogen in their respective applications.

BENTELER HYRESIST® TUBE AND PIPE SOLUTIONS MEET HIGH REQUIREMENTS

BENTELER HYRESIST® HFS describes a product family of seamless hot-rolled carbon steel tubes with special properties for hydrogen applications. The seamless hot-rolled BENTELER HYRESIST® tubes exceed the requirements of the European Industrial Gases Association (EIGA) for line pipe for distribution networks. The criteria to be met includes hydrogen-compliant steel analysis, homogeneous microstructure, optimized mechanical values and pressure resistance. BENTELER HYRESIST® meets these criteria and consequently prevents hydrogen embrittlement, making our tubulars extremely robust and durable.

YOUR ADDED VALUE

- High hydrogen resistance and excellent weldability, even at extreme temperatures ranging from -40 to +175°C
- Seamless normalized carbon steel tubes are a cost-effective alternative to stainless steel tubes
- Homogeneous material properties
- Steel grades with exceptional cleanliness levels
- Products comply with API5L, ISO 3183 and recommendations from EIGA guideline 121/14
- Outstanding toughness characteristics for low temperatures (all orientations, regardless of rolling direction)
- Pressure resistance tests of the Line Pipe ensure the safe operation of the tubulars

*HFS = Hot Finished Seamless (seamless hot-rolled steel tubes)

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DIMENSIONAL RANGE

- NPS ½" – 5" (21.3 – 141.3 mm OD)
- Schedule 40 - XXS (2.6 – 16 mm WT)
  (larger outside diameters or wall thicknesses available upon request)

AVAILABLE STEEL GRADES

- Product Specification Level (PSL2)
- **X42N/NE, X52N/NE**
  Q-Grades: X52Q/QE bis X80Q/QE on request
- **L290N/NE, L360N/NE**
  Q-Grades: L360Q/QE bis L555Q/QE on request

SPECIAL CHARACTERISTICS

- In-house steel production enables special restrictions on phosphorus and sulfur contents as well as further, undesirable accompanying elements.

Elements	BENTELER HYRESIST HFS	EIGA Doc 121/14	API 5L PSL 2/ ISO 3183
S [%]	≤ 0.003	≤ 0.010	≤ 0.015
P [%]	≤ 0.012	≤ 0.015	≤ 0.025

	X42N/X42NE L290N/L290NE	X52N/X52NE L360N/L360NE
Al:N [1])	≥ 2:1	
As + Sb + Sn [2])	≤ 0.040%	
Bi + Co + Zn [2])	≤ 0.040%	
Nb + V + Ti [2]) [3])	≤ 0.05 %	≤ 0.11 %

[1]) ISO 3183
[2]) BENTELER HYRESIST HFS
[3]) Note restricted to API 5L PSL 2, ISO 3183: max. 0.15%

- For the production of seamless tubes, we use steel from our electric arc furnace steel mill. The steel is made exclusively from scrap resulting in a lower carbon footprint than other alternatives.

- Excellent welding properties are ensured by "restricted" optimized carbon equivalents compared to the usual standards.

CE_{IIW} [%]*	BENTELER HYRESIST HFS	API 5L PSL 2	ISO 3183	EIGA Doc 121/14
X42N/X42NE L290N/L290NE	≤ 0.38	≤ 0.43	≤ 0.42	≤ 0.43
X52/X52NE L360N/L360NE	≤ 0.42	≤ 0.43	≤ 0.43	≤ 0.43

*For C > 0.12% CE_{IIW} = C + Mn/6 + (Cr+Mo+V)/5 + (Cu+Ni)/15

- Tightest tolerances and restricted strength characteristics of HYRESIST® grades prevent hydrogen embrittlement.

Tensile strength R_m [MPa]				
	BENTELER HYRESIST HFS	API 5L PSL 2	ISO 3183	EIGA Doc 121/14
X42N/X42NE L290N/L290NE	415 - 515	415 - 655	415 - 655	415 - 587
X52/X52NE L360N/L360NE	460 - 560	460 - 760	460 - 760	460 - 625

$R_{t0.5}/R_m$ max. 0.85

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